Physics Lesson Plan 5th Semester (2024-25)

Class : B.Sc.III N.M. by Ms. Poonam Devi

Month	Topics To Be Covered	Topics To Be Covered
Paper	CPL-501 Discipline Specific Course-I Elements of Modern Physics (Credits – 02, 30 Hrs (2 Hrs/week))	CPL-502 Discipline Specific Course-II Nuclear Physics (Credits – 02, 30 Hrs (2 Hrs/week))
August	**UNIT-I** Introduction to Quantisation: Properties of Thermal Radiation, Spectral Distribution of Blackbody Radiation, Kirchhoff's Law, Stefan-Boltzmann Law and Wien's Distribution and Displacement law, Rayleigh-Jean's Law, Ultraviolet Catastrophe, Planck's Quantum Postulates, Planck's Law of Blackbody Radiation: Experimental Verification. Photo-electric effect and Compton scattering; Pair production and annihilation, Bremsstrahlung effect, Cherenkov radiation, Production of X-rays.	**UNIT-I** Basic Properties of Nuclei: Nuclear composition (p-e and p-n hypotheses), Nuclear properties, Nuclear mass, size, spin, parity, magnetic dipole moment, quadrupole moment (shape concept) and binding energy, nuclear binding energy curve. Radioactivity: Law of Radioactive Decay, Half-life, Radioactive Series, α-decay: Range of α-particles, GeigerNuttal law and α-particle Spectra, β-decay, Energy Spectra and Neutrino Hypothesis, γ-decay : Origin of γ-rays.
September	**Unit- II** Bohr Model: Drawbacks of Rutherford model, Bohr atomic model; Bohr's quantization rule and atomic stability, Calculation of energy levels for hydrogen like atoms and their spectra, Effect of nuclear mass on spectra, Correspondence principle. Fundamentals of Wave Mechanics: De Broglie wavelength and matter waves; Wave-particle duality; Frank-Hertz, Davison and Germer experiment, phase velocity, group velocity and their relations	**Unit- II** Nuclear Models and Nuclear Forces: Similarity between nuclear matter and liquid drop, Liquid Drop Model, Semi-classical Mass formula, Limitations of liquid drop model, Magic number, Experimental signature of shell structure in nuclei, Nuclear Shell Model (qualitative only) and its application, Meson Theory of Nuclear Forces.
October	**UNIT-III** Heisenberg Uncertainty Principle; Estimating minimum energy of a confined particle using uncertainty principle; Energy-time uncertainty principle, Properties of wave-function, Physical Interpretation of wave-function. Schrodinger Equation: Momentum and Energy operators, Stationary states, Physical Interpretation of a wave function, probabilities and normalization, Schrodinger Equation, Particle in1-dimention infinite potential well.	**UNIT-III** Radiation Interaction: Interaction of heavy charged particles (proton, Alpha particles etc.); Energy loss of heavy charged particle (Discussion of Bethe formula), Range of alpha particles. Interaction of light charged particle (Betaparticle), Interaction of Gamma Ray: Passage of Gamma radiations through matter (Photoelectric, Compton and pair production effect), Absorption of Gamma rays (Mass attenuation coefficient), Nuclear Reactions: Types of nuclear reactions, Concept of reaction cross-section, Concept of Compound and Direct Reactions
November	**Unit – IV** LASER: Absorption and emission of radiation (qualitative only); Basic features of LASER, Population Inversion; Resonance cavity; laser pumping; threshold condition for laser emission; Einstein's Co-efficient, 3 level and 4 level system, Basic principle and working of He-Ne LASER and Ruby LASER, Applications of LASER.	**UNIT-IV** Nuclear Radiation Detectors: Gas filled counters; Ionization chamber, proportional counter, G.M. Counter (detailed study), Basic principle of scintillation counter and semiconductor detectors. Nuclear Reactors: General aspects of reactor design, Nuclear fission reactor (Principle, construction, working and use) Particle Accelerators: Particle Accelerator facilities in India, Linear Accelerator, Cyclotron, Synchrotron
December	Revision & Tests	Revision & Tests

Poonam. 22/7/2024.
Teacher Sign

Principal
GCW Hisar

Physics as Minor subject Lesson Plan 1st Semester (2024-25)

Class : B.Sc.I Life Sciences by Ms. Poonam Devi

Month	Topics To Be Covered
Paper	**Minor Course (MIC) Fundamental of Electronics- I** **Paper code: C24MIC133T. (2Hrs /week) Credits: 2**
August	**Unit- I** Energy bands in solids: Charge particles, field intensity, potential, energy and its unit, nature of atom, atomic energy levels, electronic structure of the elements, energy band theory of crystals, Insulators, semiconductors, and metals
September	**Unit- I** Transport phenomena in semiconductors: mobility and conductivity, Intrinsic and extrinsic semiconductors, charge density in a semiconductor, Electrical properties of Ge and Si, Hall effect, Generation and recombination of charges, Diffusion, and continuity equation.
October	**Unit- II** p-n junction: open circuited p-n junction, current component of p-n diode, VI characteristics and its temperature dependence behavior, p-n junction as rectifier, space charge and transition capacitance, diffusion capacitance, Breakdown diodes
November	**Unit – II** Zener diode and its characteristics. Applications of diode; Diode as a rectifier, LED, Solar cell, tunnel diodes.
December	Revision & Tests.

Poonam Devi 14/8/24
Teacher Sign

Principal
GCW Hisar

Lesson Plan
B.sc Physical Science (First semester)
Discipline specific course (Dsc)
Paper name - Mechanics

Sumit Kumar

	Mechanics (Dsc)	MDC(Multidisciplinary Course)
August	**Fundamental of Dynamics:** Rigid body, moment of Inertia, Radius of gyration, theorem of perpendicular & parallel axis, moment of Inertia ring,disc, angular disc, solid cylinder, hollow sphere torque, rotational kinetic energy, angular momentum ,law conservation of angular momentum, rolling motion, condition for pure rolling.	**Fundamental of physics:** system of measuring, measuring process, concept of mass, length, time, fundamental of derive units, system of unit
September	**Acceleration** of body rolling down an inclined plane , fly wheel , moment of Inertia of an irregular body, elasticity, deforming force , elastic limit, stree, strain, and their type, hooke law , modulus of rigidity, relation between shear angle and angle of twist , elastic energy stored /volume in an elastic body, tension rotating rod , poisson ratio and it's limiting value, elastic constants and their relation, torque required for twisting cylinder, Bending of beam, bending moment and its magnitude, dermination of elastic constants for material of wire by Searle method. **Test**	**Concept of error** , type of error (only definition) least count and application of measuring instruments, vernier caliper,screw gauge scaler and vector quantity. Distance and displacement, uniform and non uniform motion, average and instantaneous speed, average and instantaneous velocity equation of motion and their application, cause of motion. Concept of force.
October	**Gravitation and central force motion** law of gravitation , gravitational potential energy, inertial and gravitation mass , potential and field due to spherical shell, and solid sphere, motion of particle under central force field two body problems and it's reducetion one body problems and solutions deffertional equation of motion with central force it's solutions, concept of law power potential, Kepler law of planetary motion .	**Newton first law of** motion, Inertia and mass , Newton second law of motion, momentum and force , 3rd law of motion, daily life application of Newton law of motion. Universal law of gravitation and it's importance acceleration due to gravity and free fall body

November. **Special therory of Michelson morely experiment and it's outcome , postulates of special therory of relativity, Lorentz** transformation,simulataneity and order of events, Lorentz constraction , time dilation, relativistic transformation of velocity, Relativistic addition of velocity Relation of mass-energy equivalence Doppler effect, Transformation of energy momentum, Tensor transformation of force

December — Revision of Syllabus.

Physics Lesson Plan 5th Semester (2024-25)

Teacher Name: Dr. Kavita
Class : B.Sc.III C.S.

Month	Topics To Be Covered	Topics To Be Covered
Paper	CPL-501 Discipline Specific Course-I Elements of Modern Physics (Credits – 02, 30 Hrs (2 Hrs/week))	CPL-502 Discipline Specific Course-II Nuclear Physics (Credits – 02, 30 Hrs (2 Hrs/week))
August	**UNIT-I** Introduction to Quantisation: Properties of Thermal Radiation, Spectral Distribution of Blackbody Radiation, Kirchhoff's Law, Stefan-Boltzmann Law and Wien's Distribution and Displacement law, Rayleigh-Jean's Law, Ultraviolet Catastrophe, Planck's Quantum Postulates, Planck's Law of Blackbody Radiation: Experimental Verification. Photo-electric effect and Compton scattering; Pair production and annihilation, Bremsstrahlung effect, Cherenkov radiation, Production of X-rays.	**UNIT-I** Basic Properties of Nuclei: Nuclear composition (p-e and p-n hypotheses), Nuclear properties; Nuclear mass, size, spin, parity, magnetic dipole moment, quadruple moment (shape concept)
September	**Unit- II** Bohr Model: Drawbacks of Rutherford model, Bohr atomic model; Bohr's quantization rule and atomic stability; Calculation of energy levels for hydrogen like atoms and their spectra, Effect of nuclear mass on spectra, Correspondence principle. Fundamentals of Wave Mechanics: De Broglie wavelength and matter waves; Wave-particle duality; Frank-Hertz, Davison and Germer experiment, phase velocity, group velocity and their relations. **Test & Assignment**	Binding energy, nuclear binding energy curve. Radioactivity: Law of Radioactive Decay, Half-life, Radioactive Series, α-decay: Range of α-particles, GeigerNuttal law and α-particle Spectra, β-decay, Energy Spectra and Neutrino Hypothesis, γ-decay : Origin of γ-rays. **Unit- II** Nuclear Models and Nuclear Forces: Similarity between nuclear matter and liquid drop, Liquid Drop Model, Semi-classical Mass formula, Limitations of liquid drop model, Magic number, Experimental signature of shell structure in nuclei, Nuclear Shell Model (qualitative only) and its application, Meson Theory of Nuclear Forces.
October	**UNIT-III** Heisenberg Uncertainty Principle; Estimating minimum energy of a confined particle using uncertainty principle; Energy-time uncertainty principle, Properties of wave-function, Physical Interpretation of wave-function. Schrodinger Equation: Momentum and Energy operators, Stationary states, Physical interpretation of a wave function, probabilities and normalization, Schrodinger Equation, Particle in1-dimention infinite potential well.	**UNIT-III** Radiation Interaction: Interaction of heavy charged particles (proton, Alpha particles etc.); Energy loss of heavy charged particle (Discussion of Bethe formula), Range of alpha particles. Interaction of light charged particle (Betaparticle), Interaction of Gamma Ray; Passage of Gamma radiations through matter (Photoelectric, Compton and pair production effect), Absorption of Gamma rays (Mass attenuation coefficient), Nuclear Reactions: Types of nuclear reactions, Concept of reaction cross-section, Concept of Compound and Direct Reactions **Test & Assignment**
November	**Unit – IV** LASER: Absorption and emission of radiation (qualitative only); Basic features of LASER, Population inversion; Resonance cavity; laser pumping; threshold condition for laser emission, Einstein's Co-efficient, 3 level and 4 level system, Basic principle and working of He-Ne LASER and Ruby LASER, Applications of LASER.	**UNIT-IV** Nuclear Radiation Detectors: Gas filled counters; Ionization chamber, proportional counter, G.M. Counter (detailed study), Basic principle of scintillation counter and semiconductor detectors. Nuclear Reactors: General aspects of reactor design, Nuclear fission reactor (Principle, construction, working and use) Particle Accelerators: Particle Accelerator facilities in India, Linear Accelerator, Cyclotron, Synchrotron.

Physics Lesson Plan 3rd Semester (2024-25)

Class : B.Sc.II C.S. and B.Sc. II N.M. by Dr. Monika

Paper	Heat and Thermodynamics : (CPL-302)	Semiconductor Devices (CPL-303)
July-August	**Unit- I** Zeroth and First Law of Thermodynamics: Extensive and intensive thermodynamic variables, Thermodynamic equilibrium, Zeroth law and Concept of Temperature, Work and heat, State functions, First law of thermodynamics, Internal energy, Applications of first law, General relation between Cp and Cv, Work done during isothermal and adiabatic Processes . Second Law of Thermodynamics: Reversible and Irreversible process with examples, Conversion of Work into Heat and Heat into Work, Heat Engines, Carnot's Cycle, Carnot engine & efficiency, Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence, Carnot's Theorem	**UNIT-I** Semiconductor Diodes and applications: p and n type semiconductors. Barrier Formation in PN Junction Diode, Drift and Diffusion Currents, Current flow mechanism in Forward and Reverse biased PN Junction Diodes mentioning the roles of drift and diffusion currents, V-I characteristics of PN Junction Diode, Static and Dynamic Resistance, Applications of PN Junction Diode as Half-wave rectifier, Full-wave Rectifier (both center-tapped and bridge FWR).Calculation of ripple factor and rectification efficiency, Zener Diode, Applications of Zener Diode as DC voltage Regulator, Principle and structure of (1) LEDs (2) Photodiode (3) Solar Cell.
September	**Unit- II** Entropy and Third law of Thermodynamics: Concept of entropy, Clausius theorem, Clausius Inequality,Second Law of Thermodynamics in terms of Entropy, Entropy of a Perfect Gas and Universe, Entropy Changes in Reversible and Irreversible Processes, Principle of Increase of Entropy, Third Law of Thermodynamics, T-S Diagrams, Phase Change, Classification of Phase Changes.	**Unit- II** Semiconductor Transistors: Bipolar Junction transistors: n-p-n and p-n-p Transistors, Biasing of transistors in Active, Cutoff, and Saturation Modes, Circuit configurations of CB ,CE and CC transistors, characteristics of transistors in CB,CE and CC, Current gains α and β, Relations between α and β, Current gain and power gain, DC Load line and Q- point
October	**Unit- III** Thermodynamic Potentials :- Extensive and Intensive Thermodynamic Variables, Internal Energy, Enthalpy, Gibbs, Helmholtz function and Their Definitions, Properties and Applications. Maxwell's Thermodynamic Relations: - Derivations of Maxwell's Relations. Applications of Maxwell's Relations: (1) ClausiusClapeyron equation, (2) Values of CP – CV, (3) Energy equations (4) Change of temperature during adiabatic process	**UNIT-III** Amplifiers and Their Biasing: Voltage Divider Bias Circuit for CE Amplifier, bias stabilization, Class-A, B&C amplifiers, RC coupled amplifiers and its frequency response, Feedback in amplifiers, positive and negative feedback in amplifiers, Advantages of negative feedback in amplifiers, Sinusoidal Oscillators: Barkhausen's Criterion for Self-sustained oscillations, Circuit and working of Hartley oscillator, Circuit and working of Colpit's oscillator, Uses of oscillator.
November	**Unit – IV** Real gases: -, Deviations from the Ideal Gas Equation, The Virial Equation, Critical Constants. Continuity of Liquid and Gaseous State., Van der Waal's Equation of State for Real Gases. Values of Critical Constants. Law of Corresponding States. Comparison with Experimental Curves, p-V Diagrams, Joule's Experiment, Free Adiabatic Expansion of a Perfect Gas.	**UNIT-IV** Operational Amplifiers (Black Box approach): Qualitative idea of differential amplifier, CMRR, Characteristics of an Ideal and Practical Op-Amp (IC 741), Open-loop& Closed-loop Gain. concept of Virtual ground, Applications of Op-Amps as Inverting Amplifier, Noninverting Amplifier, Differentiator, Integrator.

Physics Lesson Plan 1st Semester (2024-25)

Class : B.Sc.I NM and CS. by Dr. Monika

Paper- Skill enhancement course

Paper	Instrumentation-I
July-August-September	**Unit- I** Errors in measurement, Types of error, Ohm's law, Kirchoff's current and voltage law, Wheatstone bridge, Potentiometer, Multimereter, Principle of measurement of current and voltage and resistance, Specification of multimeter and their significance, Electronic voltmeter, Principles of voltage measurement
October-November	**Unit- II** Cathode Ray Oscilloscope, Block diagram of basic CRO, CRT, Electron gun, electrostatic focusing and acceleration, screen phosphor, visual persistence, Time base operation, Front panel controls, significance of CRO, Use of CRO for measurement of voltage , frequency , time period, special features of dual trace